JACOBS

Health Safety Environment Procedure (HSEP)		Document No: HSEP 17.12-TOSC	Page: 1 of 5
Suspended Load Operations Analysis/Approval		Supersedes: NA	Revision: Basic
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1.0 PURPOSE AND SCOPE

This Health, Safety, and Environment Procedure (HSEP) implements the requirements of the NASA Alternate Safety Standard for Suspended Load Operations for the Test and Operations Support Contract (TOSC).

2.0 RESPONSIBILITIES

General responsibilities for HSE Program implementation are stated in HSEP 1.5, HSE Program Implementation Responsibilities. Additional management, staff, employee, and subcontractor responsibilities that address duties specific to this topic are stated in this procedure.

2.1. Organizations Requesting An SLOAA

2.1.1. Prepare SLOAA package consisting of:

1. Approval Sheet for Suspended Load Operations
2. SLOAA report
3. Copy of the approved (or proposed) controlling Work Authorization Document (WAD)

2.1.2. Provide the following signatures:

1. Requestor
2. TOSC and NASA System Engineers

2.1.3. Submit the SLOAA package to TOSC Safety, Health and Environment (SH&E) for review and evaluation.

2.1.4. Maintain accuracy of SLOAA packages; submit SLOAA updates through the SLOAA approval process.

2.2. Safety, Health and Environment

2.2.1. Perform an evaluation of the SLOAA package to ensure its compliance with KNPR 8715.3-1.

2.2.2. Approve and forward the original SLOAA package to the NASA KSC Lifting Devices and Equipment Manager (LDEM) for processing.

2.2.3. Forward copies of all approved Safety Variance Requests to all signatories, the TOSC Safety Console, and the applicable NASA SA division.

2.3. TOSC Safety Console

2.3.1. For real-time safety variances, obtain approval from all applicable signatories (telecon approvals are to be recorded).

2.3.2. Assign a tracking number from the Safety Variance Number Log.

2.3.3. Forward all original Safety Variance Requests to TOSC S&HE.

3.0 DEFINITIONS

Suspended Load Operation	An operation that requires personnel to perform work while beneath a suspended load.
Suspended Load Operations Analysis/Approval	An authorization to proceed with a lifting operation where personnel are required to perform work while beneath a suspended load. Used to show analysis and approval to work under a suspended load according to the NASA Alternate Safety Standard for Suspended Load Operations, which is referenced in its entirety in NASA-STD-8719.9.

4.0 PROCEDURE

4.1. General Requirements

4.1.1. The approval that allows personnel to perform work beneath a suspended load is to be documented in a Suspended Load Operations Analysis/Approval (SLOAA) package as specified in Kennedy NASA Procedural Requirements (KNPR) 8715.3-1. The SLOAA package follows the format required by the NASA Alternate Safety Standard for Suspended Load Operations. The NASA Alternate Safety Standard for Suspended Load Operations was approved by the Occupational Safety and Health Administration (OSHA) as an alternative to specific OSHA suspended load requirements.

4.1.2. A SLOAA package is to be compiled for each suspended load operation, to include the Approval Sheet for Suspended Load Operations (reference Appendix A), SLOAA report (reference Appendix B), and any other supporting data.

5.0 REFERENCES AND RELATED DOCUMENTS

Code of Federal Regulation (CFR) Title 29, Labor, Occupational Safety and Health Administration (OSHA) Part 1910, Occupational Safety and Health Standards, Section 179, Overhead and Gantry Cranes, and Section 180, Crawler Locomotive and Truck Cranes

KNPR 8715.3-1, KSC Safety Procedural Requirements

NASA-STD-8719.9, Safety Standard for Lifting Devices and Equipment

6.0 FIGURES

NA

7.0 FORMS

Form Number	Title	Location
KSC 20-200 NS	Approval Sheet for Suspended Load Operations	KSC Forms

8.0 APPENDIX

8.1. APPENDIX A – APPROVAL SHEET FOR SUSPENDED LOAD OPERATIONS

BLOCK	ENTRY DESCRIPTION
SLO-KSC-	Leave blank. (NASA KSC LDEM will provide a control number.)
Title	Provide a brief title of the suspended load task or operation.
Document Number/Title	Document number and title of controlling WAD for the suspended load operation.
Prepared By	Name of requester preparing the form.
Date	Date the requester completed the form.
Required Approval	The appropriate personnel or designee (as outlined in previous sections of this OP) will type or print his/her name and organization and sign and date the form in the appropriate block.

8.2. Appendix B – Format For SLOAA Report

NASA SUSPENDED LOAD OPERATION ANALYSIS/APPROVAL

NUMBER:
DATE:
PAGE:____OF____

OPERATION: Brief title of the operation being performed.

SUPPORTING DOCUMENTS: List of pertinent documents used in the analysis to include the WAD number and title of the controlling work document, System Assurance Analysis (SAA) number and title for the crane/hoist system, and any other attachments.

GENERAL DESCRIPTION: Give a thorough description of the operation to be performed and include the number of personnel who will be beneath the suspended load for each task.

RATIONALE/ANALYSIS: Address each of the following 15 requirements, which are excerpts from NASA-STD-8719.9 (Safety Standard for Suspended Load Operations section).

a. All suspended load operations will be approved by the Center/facility NASA Director of Safety based upon a detailed engineering hazard analysis of the operation. The analysis documentation will include the following:

1. A justification why the operation cannot be conducted without personnel beneath the load. Feasible procedure/design options will be investigated to determine if the work can be accomplished without personnel working under a load suspended from a crane/hoist.

2. Details of the precautions taken to protect personnel should the load drop. Secondary support systems, i.e., equipment designed to assume support of (catch) the load preventing injury to personnel should the crane/hoist fail, will be evaluated and used whenever feasible. Secondary support systems will be constructed with a minimum safety factor of 2 to yield.

3. The maximum number of exposed personnel allowed. Steps will be taken to limit the number of personnel working under a load suspended from a crane/hoist. Only those essential personnel absolutely necessary to perform the operation will be allowed to work in the safety-controlled area.

4. The time of exposure. Steps will be taken to ensure that personnel do not remain under the load any longer than necessary to complete the work.

b. Each operation will be reviewed on a case-by-case basis.

c. Only those suspended load operations approved by the Center/facility NASA Director of Safety will be permitted, subject to this standard. A list of approved suspended load operations will be maintained by NASA Safety and made available to OSHA personnel upon request.

d. The operational procedures document (e.g., Operations and Maintenance Instruction, Technical Operating Procedure (TOP), WAD, etc.) will be revised to specify the necessary additional requirements identified by the hazard analysis discussed in Paragraph (a). The procedures will be available on site for inspection during the operation.

e. During a suspended load operation, if a new procedure not covered by the original analysis is deemed necessary due to unusual or unforeseen circumstances, the NASA Center/facility Safety Office will be consulted and must approve and document the procedure before operations continue. Safety will coordinate with Operations, Engineering, and other organizations as appropriate. If the new procedure is to be performed on a regular basis, a detailed hazard analysis and approval as outlined in Paragraph (a) are required.

f. The crane/hoist will be designed, tested, inspected, maintained, and operated in accordance with NASA-STD-8719.9.

g. Each crane/hoist involved in suspended load operations will undergo a Failure Modes and Effects Analysis (FMEA). The FMEA will determine Single Failure Points (SFP), assessing all critical mechanical functional components and support systems in the drive trains and critical electrical components.

1. For those cranes/hoists identified as having no SFP whose failure would result in dropping the load, the total weight of the suspended load will not exceed the device's rated load.

2. For those cranes/hoists identified as having an SFP whose failure would result in dropping the load, use of that device for suspended load operations must be approved by NASA Headquarters. Complete documentation on the suspended load operation, including the hazard analysis outlined in paragraph (a) and the FMEA described above, will be forwarded to NASA Headquarters for evaluation. Approval will be given based upon detailed analysis of the potential hazards and rationale for acceptance. Such cases will never exceed the device's rated load. OSHA will be notified when NASA Headquarters approves using any crane/hoist identified as having an SFP whose failure
would result in dropping the load.

h. Before lifting the load involved in a suspended load operation, the crane/hoist will undergo a visual inspection (without major disassembly) of components instrumental in ensuring that the load will not be dropped (e.g., primary and secondary brake systems, hydraulics, mechanical linkages, and wire rope per NASA-STD-8719.9). Noted discrepancies will be resolved before the operation continues. This pre-lift inspection will be in addition to the inspections required in CFR Title 29, Part 1910.179(j) and 180(d).

i. A trained and licensed operator (certified per NASA-STD-8719.9) will remain at the crane/hoist controls while personnel are under the load.

j. Safety-controlled areas will be established with appropriate barriers (rope, cones, etc.). All nonessential personnel will be required to remain behind the barriers.

k. Prior to the suspended load operation, a meeting with the crane/hoist operator(s), signal person(s), person(s) who will work under the load, and the person responsible for the task will be held to plan and review the approved operational procedures that will be followed, including procedures for entering and leaving the safety-controlled area.

l. Communications (voice, radio, hard wired, or visual) between the operator(s), signal person(s), and the person(s) working under the load will be maintained. Upon communication loss, operations will stop immediately, personnel will clear the hazardous area, and the load will be safed. Operations will not continue until communications are restored.

m. Personnel working beneath the suspended load will remain in continuous sight of the operator(s) or the signal person(s). A method of identifying personnel working beneath a suspended load will be identified in the WAD (e.g., orange vest, armband, hazardous operation badge, etc.).

n. NASA will conduct periodic reviews to ensure the continued safety of the procedures. As a minimum, NASA will annually evaluate the implementation of this OP at each Center with operations on the suspended load list.

o. A list of approved suspended load operations, list of cranes/hoists used for suspended load operations, and copies of the associated hazard analyses will be provided to the OSHA Office of Federal Agency Programs via NASA Headquarters for distribution to the appropriate regional and area OSHA offices. (NASA Headquarters, in conjunction with OSHA, will develop a format for transmittal of this information.) Quarterly updates to the documentation will be provided as needed.